Amendments of the Claims:

A detailed listing of all claims in the application is presented below. This listing of claims will replace all prior versions, and listings, of claims in the application. All claims being currently amended are submitted with markings to indicate the changes that have been made relativerding this rejection. The changes in any amended claim are being shown by strikethrough (for deleted matter) or underlined (for added matter).

1. (Currently Amended) A method of delivering a pressurized glass melt to a glass forming apparatus, comprising the steps of:

a) delivering said glass melt through a molten glass pump, such that an output of said glass melt is transferred to said glass forming apparatus;

wherein said molten glass pump comprises:

i) a housing having an entrance end for receiving an unpressurized glass melt and a distal output end for outputting a pressurized glass melt; and

ii) a rotating hub positioned within said housing, said rotating hub including a centerline recirculation channel that traverses the length of said hub and at least one radially extending pumping element; and

b) intaking a cord portion of said glass melt at said distal output end through said centerline recirculation channel back towards said entrance end.

2. (Cancelled)

3. (Currently Amended) The method of claim 1~~2~~, further comprising the step of transporting and pressurizing said glass melt, wherein a plurality of auger flights extending radially from an external surface of said rotating hub move the molten glass from the entrance ~~inlet~~ end to the distal end of the pump.

4. (Currently Amended) The method of claim 1~~2~~, further comprising the step of:

c) ~~further comprising the step of~~ transporting, pressurizing, and mixing said glass melt, wherein a plurality of auger flights extending radially from an external surface of said rotating hub move the molten glass from the entrance ~~inlet~~ end to the distal end of the pump, said flights including at least one cutout which allow a portion of said glass melt to pass backwards into another flow path thereby mixing said glass melt.~~.~~

5. (Currently Amended) The method of claim 1~~2~~, wherein multiple sets of blades radially attached to an external surface of said rotating hub divide a flow of glass melt exiting a first set of adjacent blades as it enters a passageway of a second set of adjacent blades.

6. (Currently Amended) The method of claim 1~~2~~, wherein said molten glass pump further comprises a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing with the purpose of eliminating the rotation of the molten glass stream exiting the molten glass pump.

7. (Original) The method of claim 6, further comprising the step of uptaking a peripheral portion of said glass melt at said distal end of said molten glass pump back towards said entrance end through a peripheral recirculation channel lying between said counter-rotating sleeve and said housing.

8. (Currently Amended) The method of claim 1~~2~~, wherein said molten glass pump further comprises:

iii) a first stage including a plurality of auger flights extending radially from an external surface of a first-half portion of said rotating hub, wherein said auger flights recirculate any poorly homogenized glass that flows off a tip of the auger flights back into a fluid stream of glass; and

iv) a second stage including multiple sets of blades that are radially attached to an external surface of a second-half portion of said rotating hub, wherein any two adjacent sets of blades are positioned such that a flow of glass melt exiting a first

set of adjacent blades is divided as it enters a passageway of a second set of adjacent blades.

9. (Original) The method of claim 8, wherein said molten glass pump further comprises a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

10. (Original) The method of claim 9, further comprising the step of uptaking a peripheral portion of said glass melt at said distal end of said molten glass pump through a peripheral recirculation channel lying between said counter-rotating sleeve and said housing back towards said entrance end.

11. (Currently Amended) The method of claim 8, wherein said plurality of auger flights comprise at least one cutout allowing~~that~~ a portion of said glass melt to pass backwards into another flow path thereby mixing said glass melt.

12. (Currently Amended) A glass manufacturing system comprising:

a) a glass-melting furnace;

b) a fore hearth connected to said furnace;

c) a molten glass pump connected to said fore hearth that pressurizes and homogenizes an unpressurized glass melt into a pressurized glass melt, wherein said molten glass pump comprises:

i) a housing having an entrance end for receiving said unpressurized glass melt and a distal output end for outputting said pressurized glass melt; and

ii) a rotating hub positioned within said housing, said hub comprising a centerline recirculation channel that traverses the length of said hub and at least one radially extending pumping element, wherein said centerline recirculation channel intakes a cord portion of said glass melt at said distal output end

and conducts said cord portion through said centerline recirculation channel back towards said entrance end;

d) a delivery tube to deliver said pressurized glass melt from said molten glass pump; and

e) a glass-forming device for receiving said pressurized glass melt from said delivery tube.

13. (Original) The glass manufacturing system of claim 12, wherein said rotating hub further comprises a plurality of auger flights extending radially from an external surface of said rotating hub, wherein said auger flights recirculate any poorly homogenized glass that flows off a tip of the auger flights back into a fluid stream of glass.

14. (Original) The glass manufacturing system of claim 13, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

15. (Original) The glass manufacturing system of claim 14, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

16. (Original) The glass manufacturing system of claim 12, wherein said rotating hub further comprises a plurality of auger flights extending radially from an external surface of said rotating hub, wherein said plurality of auger flights include at least one cutout that allows a portion of said glass melt to pass backwards into another flow path thereby mixing said glass melt.

17. (Original) The glass manufacturing system of claim 16, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

18. (Original) The glass manufacturing system of claim 17, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

19. (Original) The glass manufacturing system of claim 12, wherein said rotating hub further comprises multiple sets of blades radially attached to an external surface of said rotating hub, wherein any two adjacent sets of blades are positioned such that a flow of glass melt exiting a first set of adjacent blades is divided as it enters a passageway of a second set of adjacent blades.

20. (Original) The glass manufacturing system of claim 19, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

21. (Original) The glass manufacturing system of claim 20, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

22. (Original) The glass manufacturing system of claim 19, wherein said blades are pitched in one direction.

23. (Original) The glass manufacturing system of claim 19, wherein said blades have different lengths.

24. (Original) The glass manufacturing system of claim 19, wherein said blades are arranged in a helical pattern around said rotating hub.

25. (Original) The glass manufacturing system of claim 19, wherein said blades of a first set of adjacent blades overlap with that of a second set of adjacent blades.

26. (Currently Amended) The glass manufacturing system of claim 19, wherein said blades are pitched in two directions and at varying pitches~~.~~.

27. (Original) The glass manufacturing system of claim 19, wherein said blades are arranged with varied spacing between said blades.

28. (Original) The glass manufacturing system of claim 12, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

29. (Original) The glass manufacturing system of claim 28, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

30~~28~~. (Currently Amended) The glass manufacturing system of claim 12, wherein said molten glass pump further comprises:

a) a first stage including a plurality of auger flights extending radially from an external surface of a first-half portion of said rotating hub, wherein said auger flights recirculate any poorly homogenized glass that flows off a tip of the auger flights back into a fluid stream of glass; and

b) a second stage including multiple sets of blades that are radially attached to an external surface of a second-half portion of said rotating hub, wherein any two adjacent sets of blades are positioned such that a flow of glass melt exiting a first set of adjacent blades is divided as it enters a passageway of a second set of adjacent blades.

31~~29~~. (Currently Amended) The glass manufacturing system of claim 30~~12~~, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating

hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

320. (Currently Amended) The glass manufacturing system of claim 3129, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

331. (Currently Amended) The glass manufacturing system of claim 3028, wherein said plurality of auger flights comprise at least one cutout that allows a portion of said glass melt to pass backwards into another flow path thereby mixing said glass melt.

342. (Currently Amended) A molten glass pump for pressurizing and homogenizing a glass melt, comprising:

a) a housing having an entrance end for receiving an unpressurized glass melt and a distal output end for outputting a pressurized glass melt; and

b) a rotating hub positioned within said housing, said hub comprising a centerline recirculation channel that traverses the length of said hub and at least one radially extending pumping element, wherein said centerline recirculation channel intakes a cord portion of said glass melt at said distal output end and conducts said cord portion through said centerline recirculation channel back towards said entrance end.

353. (Currently Amended) The molten glass pump of claim 342, wherein said rotating hub further comprises a plurality of auger flights extending radially from an external surface of said rotating hub, wherein said auger flights recirculate any poorly homogenized glass that flows off a tip of the auger flights back into a fluid stream of glass.

364. (Currently Amended) The molten glass pump of claim 353, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said

counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

375. (Currently Amended) The molten glass pump of claim 364, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

386. (Currently Amended) The molten glass pump of claim 342, wherein said rotating hub further comprises a plurality of auger flights extending radially from an external surface of said rotating hub, said plurality of auger flights including at least one cutout that allows a portion of said glass melt to pass backwards into another flow path thereby mixing said glass melt.

397. (Currently Amended) The molten glass pump of claim 386, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

4038. (Currently Amended) The molten glass pump of claim 397, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

4139. (Currently Amended) The molten glass pump of claim 342, wherein said rotating hub further comprises multiple sets of blades radially attached to an external surface of said rotating hub, wherein any two adjacent sets of blades are positioned such that a flow of glass melt exiting a first set of adjacent blades is divided as it enters a passageway of a second set of adjacent blades.

420. (Currently Amended) The molten glass pump of claim 4139, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said

counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

43~~1~~. (Currently Amended) The molten glass pump of claim 42~~0~~, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

44~~2~~. (Currently Amended) The molten glass pump of claim 41~~39~~, wherein said blades are pitched in one direction.

45~~3~~. (Currently Amended) The molten glass pump of claim 41~~39~~, wherein said blades have different lengths.

46~~4~~. (Currently Amended) The molten glass pump of claim 41~~39~~, wherein said blades are arranged in a helical pattern around said rotating hub.

47~~5~~. (Currently Amended) The molten glass pump of claim 41~~39~~, wherein said blades of a first set of adjacent blades overlap with that of a second set of adjacent blades.

48~~6~~. (Currently Amended) The molten glass pump of claim 41~~39~~, wherein said blades are pitched in two directions and at varying pitches.

49~~7~~. (Currently Amended) The molten glass pump of claim 41~~39~~, wherein said blades are arranged with varied spacing between said blades.

50~~48~~. (Currently Amended) The molten glass pump of claim 34~~2~~, wherein said rotating hub further comprises:

a) a first stage including a plurality of auger flights extending radially from an external surface of a first-half portion of said rotating hub, wherein said auger flights recirculate any poorly homogenized glass that flows off a tip of the auger flights back into a fluid stream of glass; and

b) a second stage including multiple sets of blades that are radially attached to an external surface of a second-half portion of said rotating hub, wherein any two adjacent sets of blades are positioned such that a flow of glass melt exiting a first set of adjacent blades is divided as it enters a passageway of a second set of adjacent blades.

5149. (Currently Amended) The molten glass pump of claim 5032, further comprising a counter-rotating sleeve having a direction of rotation opposite to that of said rotating hub, said counter-rotating sleeve surrounding said rotating hub and being disposed within said housing.

5250. (Currently Amended) The molten glass pump of claim 5149, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.

5351. (Currently Amended) The molten glass pump of claim 5048, wherein said plurality of auger flights comprise at least one cutout that allows a portion of said glass melt to pass backwards into another flow path thereby mixing said glass melt.

54. (New) A method of delivering a glass melt to a glass forming apparatus, comprising the steps of:

a) delivering the glass melt through a molten glass homogenizer, such that an output of the glass melt is transferred to the glass forming apparatus;

wherein the molten glass homogenizer comprises:

i) a housing having an entrance end for receiving a glass melt and a distal output end for outputting the glass melt;

ii) a rotating hub positioned within the housing, the rotating hub including a plurality of mixing elements extending radially from an external surface of

the rotating hub to mix the molten glass as the glass moves from the entrancet end to the distal end of the homogenizer; and

iii) a counter-rotating sleeve surrounding a length of the mixing elements; and

b) adjusting a relative rotational speed of the hub and the counter-rotating sleeve such that the counter-rotating sleeve straightens a macroscopic vorticity of the glass flowing out of the distal output end of the homogenizer.

55. (New) An apparatus for delivering a homogenized glass melt to a glass forming apparatus, comprising:

a) a housing having an entrance end for receiving a glass melt and a distal output end for outputting the glass melt;

b) a rotating hub positioned within the housing, the rotating hub including a plurality of mixing elements extending radially from an external surface of the rotating hub to mix the molten glass as the glass moves from the entrance end to the distal end of the homogenizer; and

c) a counter-rotating sleeve surrounding a length of the mixing elements;

wherein a speed of the hub and a speed of the counter-rotating sleeve are adjusted such that the counter-rotating sleeve straightens a macroscopic vorticity of the glass flowing out of the distal output end of the homogenizer.

56. (New) The apparatus of claim 55, wherein the mixing elements produce a pumping action.

57. (New) The apparatus of claim 56, wherein the hub further comprises a centerline recirculation channel that traverses the length of said hub, wherein said centerline recirculation channel intakes a cord portion of said glass melt at said distal output end and conducts said cord portion through said centerline recirculation channel back towards said entrance end.

58. (New) The apparatus of claim 56, further comprising a peripheral recirculation channel lying between said counter-rotating sleeve and said housing, wherein a peripheral portion of said glass melt at said distal end of said molten glass pump is conducted through the peripheral recirculation channel back towards said entrance end.